

LIBRARY OF THE
UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

016.7114
C73e
no. 288-300



CITY PLANNING AND
LANDSCAPE ARCHITECTURE

016.7114 *uf.*
C732
288-300

UNIVERSITY OF ILLINOIS LIBRARY

Name *Bridges*

Identification Number *2-19*

Address

~~R. M. Petty
570-68-0130
5 Fishers Ct. U
367-1629~~

Digitized by the Internet Archive
in 2010 with funding from
University of Illinois Urbana-Champaign

May 1972

288

**THE PSYCHOLOGY AND PHYSIOLOGY OF LIGHT AND COLOR AS
AN ISSUE IN THE PLANNING AND MANAGING OF
ENVIRONMENTS: A Selected Bibliography**

D. Geoffrey Hayward

Doctoral Candidate, Environmental Psychology Program
The City University of New York

Mrs. Mary Vance, Editor
Post Office Box 229
Monticello, Illinois 61856

THE LIBRARY OF THE

MAY 15 1972

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

THE PSYCHOLOGY AND PHYSIOLOGY OF
LIGHT AND COLOR AS AN ISSUE IN THE
PLANNING AND MANAGING OF ENVIRONMENTS:
A SELECTED BIBLIOGRAPHY

D. Geoffrey Hayward
Doctoral Candidate
Environmental Psychology Program
The City University of New York

The study of light and lighting is not circumscribed by any one profession nor by any one discipline considered separately. In fact, light¹ is studied by lighting engineers, architects, psychologists, physiologists, color consultants, biologists, ophthalmologists and others. Typically, such an array presents one with problems: not only are there problems of communication between these professions, but there are also the problems of differing goals and purposes between these same groups. For instance, a lighting engineer is interested in the specification of light and lighting equipment to satisfy certain standards of illumination; an ophthalmologist is interested in the effects of light and color on the human eye; an architect is interested in the design of environments (including light, temperature, and so on) to suit defined human activities and purposes.

¹I have used the term 'light' throughout this introduction in the interest of consistency; however, that does not prejudice my inclusion of color since the two are inseparable as topics of study. Perhaps it would have been helpful to say "light and/or color" each time, but I chose not to. Also, it is possible for one to be most interested in either light or color-recognizing that the two are inseparable and that one should recognize both as influences-and my use of the term 'light' probably reflects my greater interest in the light and lighting aspects of these matters.

For reasons which stem from such problems, I have recently attempted several literature searches in an effort to find material relevant to the "psychology of light." There are several reasons for this approach: (1) I find it interesting to read about research or discussion on lighting conducted by people in other disciplines; (2) in order to understand what is being said by these different people, it is helpful to obtain a selection of purposes and assumptions from a variety of sources; and (3) it has been my hope that the understanding of diverse points of view on a similar topic will aid in a more precise understanding of my own work, affording new ideas for study as well as helping to evaluate the utility of my conceptual approach as compared to another.

I have been particularly interested in conceptual approaches which have some relevance to the application of ideas about light to the design of environments and to the study of environmental influences on behavior. Accordingly, conceptual approaches which focus on the biological effects of light upon the human eye are peripherally relevant; conceptual approaches which focus on perceptual idiosyncracies, visual afterimages, cortical responses, and the like are judged as not relevant; further, conceptual approaches which emphasize systems theory, information theory, cross modal perceptual influences, perceptual theory which includes the environment, and molar conceptions of the environment are preferred to conceptual approaches which emphasize individual stimuli, the perception of point light sources, and the measurement of color discrimination. My interest in conceptual approaches is also limited by my interest in human behavior. Although I cannot deny the scientific value of studying rats, cats, frogs, fish, earthworms, pigeons, chicken, ducks, starlings, planaria, Hydra,

squirrels, sockeye salmon, rabbits, houseflies, spiders, turtles, and rhesus monkeys,² I am not very adept at applying such research to the issues of the design of environments for people.

As a consequence of this literature search, I have begun to think of two broadly conceived conceptual approaches to the study of light and lighting. Roughly speaking, one is academic and the other is practical. Each of these approaches subsumes other categories which are more closely related to delimited areas of interest. I will discuss the academic approach first.

One reasonable way to characterize the academic approach centers on the fact that much of the work is conducted by an experimenter. Whether laboratory or naturalistic settings are used, there is usually a well defined system of variables manipulated and variables measured. Perhaps this approach is best considered as the psychological and/or physiological approach, since those are the two fields of study which readily qualify in this kind of work. Within this broad conceptual approach, two categories emerge: the psychological-minute and the psychological-global. Someone studying the perception of color chips, contrast, form discrimination, or light sensitivity is working at the psychological-minute level. Someone studying preferences for lighting installations, affect as related to light and color, or the interpretation of Rorschach test results as an indicator of personality is working at the psychological-global level. Often, this work is good research work; unfortunately, the variables are usually trivial and more closely related

² This list of subjects was culled from one volume of the Psychological Abstracts Index from articles which were referenced under the category: 'light'.

to implications for personality assessment than to implications for planning environments.

The practical approach may be characterized as the study and application of light and color theories in actual design situations. Within this broad category are two conceptually distinct professions: color consultant, and lighting engineer. Although this approach is not characterized by laboratory experiments, it does afford an important attitude about the design of environments. That is, there are some color consultants and lighting engineers who are likely to view each design application as an experiment, rather than viewing it as a final expression of well defined practices.³ Therefore there may be a system of variables--manipulated and measured--in this approach which one may not have expected. In any event, there is an attempt to hypothesize and test out various ideas, and to that extent there is research work conducted here as well as in the academic approach. Often this work is not good research work: it has poorly defined measures and inadequate testing situations. At times the variables may be consciously manipulated, but nothing is measured as an evaluation. However, this research is conducted on variables in which we are most interested: the applications are "real-life," the measures are relevant to human behavior, and the behaviors studied are ones which have consequences in our everyday lives.

3

Of course, not all color consultants and lighting engineers hold this view; furthermore, I am unclear as to why some hold this view and others don't. Short of ascribing some personality characteristics as differentiating criteria, perhaps it would be best to say that the designers and engineers who presently recognize research as a valid tool of a design process are more likely to hold this view than their unenlightened colleagues.

Of course, there are problems with the characterizations which I have presented; I am aware of the discipline-determined nature of the categories and the temptation to present these four characterizations (psychological-minute, psychological-global, color consultant, lighting engineer) as an adequate way to classify the work which is presently being conducted. They are not; they merely give a picture of the traditional fields from which today's lighting research is likely to emerge. Happily, there are some studies which pay no attention to these categories, proceeding to study interesting phenomena on grounds which are relevant to environmental design. We desperately need much more of that kind of work.

This bibliography is not without its own peculiar limits. There was ample opportunity to increase the number of references to six or seven times the number included, but I felt somewhat uncomfortable with most of them as examples of interesting work. Furthermore, that number would not have included the extensive references of some of the works included in this list.⁴ The material which follows is strong in its consideration of the work of color consultants and lighting engineers. Most of the early work in this field (notably, most of the work of Matthew Luckiesh and his colleagues) has not been included.⁵ This material is not so strong in its consideration of foreign work, nor in its consideration of work from the psychological-global characterization. The list is nearly devoid

⁴For instance, the Architectural Research Laboratory's book: Environmental Abstracts, includes annotated references to (seemingly) hundreds of publications; Faber Birren's book: Light, Color and Environment, Bishop and Henry's chapter: "Spatial Vision", and the ERIC article: "Effects of facilities on educational achievement" each have vast reference lists.

⁵Much of the early work in this field is reviewed by the Architectural Research Laboratory (Ser 1: Environmental Abstracts).

of references to the architectural periodicals due to the superficial treatment and the limited opportunities for objective behavioral evaluation (there is opportunity for limited esthetic evaluation) of the lighting designs presented there.

The compilation of this list was made possible through the generous assistance of Edward Campbell of the Better Light Better Sight Bureau, Ruth Marcolino of the New York Regional Medical Library, and Mrs. Benjamin of the Mid-Manhattan Library, through the time and assistance of Howard Haynes of the Illuminating Engineering Research Institute, and the encouragement and advice of Dr. William Ittelson of City University's Environmental Psychology Program. My sincere thanks to them all.

- Aldworth, R. C.; D. J. Bridgers. "Design for variety in lighting." Lighting Research and Technology, 3, 1, 1971, 8-23.
- Alkire, Armand A. Light in the Human Environment ...as the psychologist sees it. Los Angeles: Sunbeam Lighting Company, 1970. 19 pps.
- Architectural Research Laboratory. SER 1: Environmental Abstracts. Ann Arbor: University of Michigan Press, 1965. 765 pps.
- Architectural Research Laboratory. SER 2: Environmental Evaluations. Ann Arbor: University of Michigan Press, 1965. 186 pps.
- Architectural Research Laboratory. SER 3: Environmental Analysis. Ann Arbor: University of Michigan Press, 1965. vp.
- Aschoff, J.; M. Fatranska; H. Giedke. "Human Circadian Rhythms in Continuous Darkness--Entrainment by Social Cues." Science, 171, January 1971, 213-215.
- Ballowitz, Leonore; Renate Heller; Jurgen Natzschka; Michaela Ott. "The Effect of Blue Light on Infant Gunn Rats." Birth Defects: Original Article Series, 6, 2, June 1970, 106-113.
- Beck, J. "Lightness and Orientation." American Journal of Psychology, 82, September 1969, 359-366.
- Beck, J. "Surface Lightness and Cues for the Illumination." American Journal of Psychology, 84, March 1971, 1-11.
- Beljaeva, N. M.; G. V. Kamenskaja; A. B. Matveev; J. L. Tochadze. "Principles of Effective Values Construction for a Visual Sensations Appraisal in Lighting Engineering." Paper presented at C.I.E. conference 17th Session, Barcelona, Spain, 1971, paper no. P 71.32.
- Berry, Paul C. "The Effect of Colored Illumination upon Perceived Temperature." Journal of Applied Psychology, 45, 1961, 248-250.
- Birren, Faber. "Ophthalmic Aspects of Illumination, Brightness, and Color." Transactions, American Academy of Ophthalmology and Otolaryngology, May-June 1948, 566-584.
- Birren, Faber. "An Organic Approach to Illumination and Color." Transactions, American Academy of Ophthalmology and Otolaryngology, January-February 1952, 109-118.
- Birren, Faber. "Color is More than Beauty." Modern Hospital, 1952, 3 pps.
- Birren, Faber. "The Emotional Significance of Color Preference." American Journal of Occupational Therapy, 6, 1952, 5pps.

- Birren, Faber. "The Psychology of Color in the Schoolroom." Better Light Better Sight News, August 1956, 3 pps.
- Birren, Faber. "The Effects of Color on the Human Organism." American Journal of Occupational Therapy, 13, 1959, 1-6.
- Birren, Faber. Color, Form, and Space. New York: Reinhold, 1961, 128 pps.
- Birren, Faber. "The Rational Approach to Color in Hospitals." Hospital, September 1961, 2 pps.
- Birren, Faber. "Color in Color." Progressive Architecture, September 1967, 129-133.
- Birren, Faber. "Psychological Implications of Color and Illumination." Illuminating Engineering, May 1969, 6 pps.
- Birren, Faber. "How Color Can Create an Environment of Excellence in the Classroom." American Seating Company, 1969, 11 pps.
- Birren, Faber. Light, Color and Environment. New York: Van Nostrand Reinhold, 1969, 131 pps.
- Bishop, P. O.; G. H. Henry. "Spatial Vision." Annual Review of Psychology, 22, 1971, 119-160.
- Blasdel, Hugo G. "Multidimensional Scaling for Architectural Environments." Proceedings, Environmental Design Research Association Third Annual Conference, January 1972, 25-1-1 to 25-1-10 plus 2 pps.
- Boyce, P. R. "The Measurement of Effort in the Performance of a Visual Task." Capenhurst, Chester, England: Electricity Council Research Centre, Job No. 019, March 1971, 36 pps.
- Boyce, P. R. "Illumination and the Sensitivity of Performance Measures." Capenhurst, Chester, England: Electricity Council Research Centre, Job No. 025, July 1971, 41 pps.
- Bradley, R. D. "The Layman's Use of 'Quality Lighting' Appraisal Systems." Illuminating Engineering, July 1968, 355-360.
- Brundrett, Geoffrey W. "Flicker and Personality," in The Perception and Application of Flashing Lights, pps 391-395. London: Adam Hilger, Ltd. 1971.
- Burg, A. "Light Sensitivity as Related to Age and Sex." Perceptual Motor Skills, 24, June 1967, 1279-1288.
- Bynum, J. A.; J. A. Stern. "Painted Helicopter Main Rotor Blades and Flicker-Induced Vertigo." Aerospace Medicine, 40, June 1969, 622-626.

- Campbell, Edward A. (Editor). "Color Moves Walls." Better Light Better Sight News, 23, April 1956, 10-11.
- Car-Gavrilovic, Ivana. "The effect of the intensity of lighting on the simple mental work of school children." (English abstract) Acta. Inst. Psychologici, 1964, No. 35-48, 59-64.
- Cavonius, C. R.; R. Hilz. "Visual Performance after Preadaptation to Colored Lights." Journal of Experimental Psychology, 83, March 1970, 359-365.
- Childers, D. G.; N. W. Perry. "Alpha-like Activity in Vision," Brain Research, 25, 8 January 1971, 1-20.
- Choungourian, A. "Color Preferences--A Cross-cultural and Cross-sectional Study." Perceptual Motor Skills, 28, June 1969, 801-802.
- Church, F. E. "Lighting for Color Judgment." Better Light Better Sight News, 27, May-June 1961, 12-13.
- Churchman, A. T. "Physiological effects of high light levels." Electronics and Power, 17, January 1971, 4-7.
- Cockram, A. H.; J. B. Collins; F. J. Langdon. "A Study of User Preferences for Fluorescent Lamp Colours for Daytime and Night-time Lighting." Lighting Research & Technology, 2, 4, 1970, 249-256.
- Daehler, M. W. "Children's Manipulation of Illusory and Ambiguous Stimuli, Discriminative Performance, and Implications for Conceptual Development." Child Development, 41, March 1970, 225-241.
- Dantzig, N. M.; D. N. Lazarev; M. V. Sokolov. "Ultra-Violet Installations of Beneficial Action." Compte Rendu, Seizieme Session, Washington, D.C., June 1967, (International Commission on Illumination, publication C.I.E. No. 14A, 1968).
- Dawe, S. P.; A. P. Marsden. "Words for lighting appraisals." Lighting Research & Technology, 1, 4, 1969, 255-257.
- Dorsey, R. T. "A Unified System for the Esthetic and Engineering Approaches to Lighting," paper presented at C.I.E. conference 17th Session, Barcelona, Spain, 1971, paper no. 71.15, 10 pps.
- Educational Resources Information Center. "Effects of Facilities on Educational Achievement: A Selected Bibliography." Madison, Wisconsin: Wisconsin University, May 1970, 57 pps. Microfiche: ED041379.
- Einhorn, H. D. "Oriented Lighting." Lighting Research & Technology, 2, 4, 1970, 246-248.
- Flynn, John E.; Samuel Mills. Architectural Lighting Graphics. New York: Reinhold, 1962, 223 pps.

- Flynn, John E.; Arthur W. Segil. Architectural Interior Systems: Lighting, Air Conditioning, Acoustics, New York: Van Nostrand Reinhold, 1970, 306 pps.
- Fry, G. A. "Discomfort Glare Produced by Continuous Luminous Ceilings." Illuminating Engineering, 63, August 1968.
- Gerard, Robert M. Differential Effects of Colored Lights on Psychophysiological Functions. Doctoral Dissertation, University of California at Los Angeles, 1957.
- Gerard, Robert M. "Color and Emotional Arousal." American Psychologist, 13, July 1958, 540.
- Goldstein, Kurt. "Some Experimental Observations Concerning the Influence of Colors on the Function of the Organism." Occupational Therapy, 21, June 1942, 147-151.
- Gregson, R.A.M. "Modification of Perceived Relative Intensities of Acid Tastes by Ambient Illumination Changes." Australian Journal of Psychology, 16, 3, 1964, 190-199.
- Griffin, M. V.; J. H. Mauritzen; J. V. Kasmar. "The Psychological Aspects of the Architectural Environment- A Review." American Journal of Psychiatry, 125, February 1969, 1057-1062.
- Guth, Sylvester K. "Lighting Research." American Industrial Hygiene Association Journal, 23, September-October 1962, 359-371.
- Guth, Sylvester K. "Lighting for Visual Performance and Comfort." Journal of the American Optometric Association, 41, 1, January 1970, 63-71.
- Harmon, D. B. "Lighting and Child Development." Illuminating Engineering, 40, 4, April 1945, 198-228.
- Harmon, D. B. "School Lighting and Posture." Illuminating Engineering, July 1954, 363-366.
- Hesselgren, Sven; Agda Holmsen. "Psychological Problems of Lighting." Stockholm, Sweden: Minutes from C.I.E. Study Group 'A' Symposium, 1969, 50 pps plus.
- Hewitt, H. "The Lighting Community." Lighting Research & Technology, 3, 1, 1971, 1-7.
- Hewitt, H. "Lighting for Buildings- the new approach." Illuminating Engineering Society Lighting Review (Australia), 30, 1, February 1968, 10-15.
- Hill, Evelyn F. Affect Aroused by Color, A Function of Stimulus Strength. Doctoral Dissertation, The Catholic University of America, 1964, 65 pps.
- Himmelfarb, Philip; Arthur Scott; Philip S. Thayer. "Bactericidal Activity of a Broad-Spectrum Illumination Source." Applied Microbiology, 19, 6, June 1970, 1013-1014.

- Hodr, R. "Phototherapy of Hyperbilirubinemia in Premature Infants." Ceskoslovenska Pediatrie, 26, February 1971, 80-82. Translation by Duro-Test Corporation, North Bergen, New Jersey.
- Houghton, F. C.; H. T. Olson; John Suci, Jr. "Sensation of Warmth as Affected by the Color of the Environment." Illuminating Engineering, December 1940, 908-914.
- Hurvich, Leo M.; Dorothea Jameson. The Perception of Brightness and Darkness, Boston: Allyn & Bacon, 1966, 141 pps.
- Ilyanok, V. A.; V. G. Samsonova. "Effect of Brightness Distribution in the Visual Field of the Observer on the Functional State of Different Human Brain Regions." Paper presented at C.I.E. Conference 17th Session, Barcelona, Spain, 1971, paper no. P 71.29.
- Inui, Masao. "Color in the Interior Environment." Lighting Research & Technology, 1, 2, 1969, 86-94.
- Ishak, I. G.; H. Bouma; H. J. Van Bussel. "Subjective Estimates of Colour Attributes for Surface Colours." Vision Research, 10, June 1970, 489-500.
- Jay, Maurice. "Light as Art and Entertainment." Light and Lighting, 61, 2, February 1968, 35-43.
- Jay, Peter A. "Light as Art and Entertainment." Transactions of the Illuminating Engineering Society, (London), 33, 2, 1968, 47-63.
- Johnson, Bettye U. A Study of Color in the Classroom Environment. Doctoral Dissertation, The University of Tennessee, 1962, 123 pps.
- Johnson, Bettye U. "Coloring Classrooms." Better Light Better Sight News, May-June 1965, 10-11.
- Kohn, Irne R. "The Influence of Color and Illumination on the Interpretation of Emotions." Masters Thesis, University of Utah, Department of Psychology, 1967, 108 pps.
- Lemaigre-Voreaux P. "Some Possibilities of Photoluminescent Radiation Sources." Lux, June 1970, 336-341. Translation by Duro-Test Corporation, North Bergen, New Jersey.
- Lemaigre-Voreaux P. "In favor of 'Deluxe' Fluorescent Lamps." Lux, No. 60, December 1970, 564-565. Translation by Duro-Test Corporation, North Bergen, New Jersey.
- Lodge, A.; J. C. Armington; A. B. Barnet; et.al. "Newborn Infants' Electroretinograms and Evoked Electroencephalographic Responses to Orange and White Light." Child Development, 40, March 1969, 267-293.
- Loomis, W. F. "Rickets." Scientific American, 223, 6, December 1970, 77-91.

- Luckiesh, Matthew. "Effects of Classroom Lighting upon Educational Progress and Visual Welfare of School Children." Illuminating Engineering, 35, 1970, 915-938.
- Manning, Peter. "Lighting in Relation to other Components of the Total Environment." Transactions of the Illuminating Engineering Society (London), 33, 4, 1968, 159-166.
- Markus, Thomas A. "The Significance of Sunshine and View for Office Workers." Cardiff, England: Welsh College of Advanced Technology, School of Architecture, 34 pps.
- Markus, Thomas A. "The Function of Windows-- a Reappraisal." Building Science, 2, 1967, 97-121.
- Maslow, Abraham H.; Norbett L. Mintz. "The Effects of Esthetic Surroundings: 1. Initial Short-Term Effects of Three Esthetic Conditions upon Perceiving Energy and Well-Being in Faces." Journal of Psychology, 41, 1956, 247-254.
- McGuinness, William J.; Benjamin Stein; Charles Merrick Gay; Charles De van Fawcett. Mechanical and Electrical Equipment for Buildings, Fourth Edition. New York: John Wiley and Sons, 1964, 658 pps.
- McVey, G. F. "Environment for Learning." Education Resources Information Center microfiche ED030292, 1969, 38 pps.
- Mintz, Norbett L. "Effects of Esthetic Surroundings: II. Prolonged and Repeated Experience in a Beautiful and an Ugly Room." Journal of Psychology, 41, 1956, 459-466.
- Nakshian, Jacob S. "The Effects of Red and Green Surroundings on Behavior." Journal of General Psychology, 70, 1, 1964, 143-161.
- Nourse, J. C.; R. B. Welch. "Emotional Attributes of Color-- a Comparison of Violet and Green." Perceptual Motor Skills, 32, April 1971, 403-406.
- Neer, R. M.; T. Davis; L. Thorington. "Use of Environmental Lighting to Stimulate Calcium Absorption in Healthy Men." Clinical Research, 18, 4, December 1970, 665.
- Neer, R. M., et al. "Stimulation by Artificial Lighting of Calcium Absorption in Elderly Human Subjects." Nature, 229, 22 January 1971, 2 pps.
- Payne, M. Carr, Jr. "Apparent Weight as a Function of Hue." American Journal of Psychology, 74, 1961, 104-105.
- Roethlisberger, F. J.; W. J. Dickenson. Management and the Worker. Cambridge: Harvard University Press, 1939.
- Rogers, Susan. "Just What the Doctor Ordered." New York Post, 26 March 1969, p. 60 (magazine p.8).

13. CPL Exchange Bibliography #288

Rosenthal, R.; R. L. Rosnow. The Artifact in Behavioral Research. New York: Academic Press, 1969.

Rowlands, E.; D. L. Loe; Isobel M. Waters; R. G. Hopkinson. "Visual Performance in Illuminance of Different Spectral Quality." Paper presented at C.I.E. Conference 17th session, Barcelona, Spain, 1971, paper no. 71.36.

Saunders, J. E. "The Role of the Level and Diversity of Horizontal Illumination in an Appraisal of a Simple Office Task." Lighting Research and Technology, 1, 1, 1969.

Seagers, Paul W. Light, Vision and Learning. New York: Better Light Better Sight Bureau, 1963, 95 pps.

Seagers, Paul W.; G. Harold Hart. "Color in the Classroom." Better Light Better Sight News, 29, 2, May-June 1963, 12-13.

Schontz, W. D.; G. A. Trumm; L. G. Williams. "Color Coding for Information Location." Human Factors, 13, June 1971, 237-246.

Smets, G. "Time Expression of Red and Blue." Perceptual Motor Skills, 29, October 1969, 511-514.

Srivastava, Rajendra K.; Thomas S. Peel. "Human Movement as a Function of Color Stimulation." Milieu (University of Kansas), 4, 1968, 7 pps.

Stuckey, William K. (Ed.). "The Treacherous Light Bulb." Reports on Research (Massachusetts Institute of Technology), April 1970, 2 pps.

Thorington, Luke. "Polluted Light?" Hospital Practice, 4, 1, January 1969, 9.

Thorington, Luke; Lynn Cunningham; J. Parascandola. "The Illuminant in the Prevention and Phototherapy of Hyperbilirubinemia." Illuminating Engineering, April 1971, 240-250.

Thorington, Luke; Louis Parascandola; Lynn Cunningham. "Visual and Biological Aspects of an Artificial Sunlight Illuminant." Journal of the Illuminating Engineering Society, October 1971, 33-41.

Trevor-Roper, P. "The Psychopathology of Colour." Transactions, the Ophthalmologists Society of the United Kingdom, 89, 1970, 251-257.

Volkova, N. V. "Experience in the Use of Erythemic Ultraviolet Radiation in the General Lighting System of a Machine Shop." Gigiena i Sanitariya, 32, October 1967, 109-111. Translation by Duro-Test Corporation, North Bergen, New Jersey.

Wright, Benjamin. "The Influence of Hue, Lightness, and Saturation on Apparent Warmth and Weight." American Journal of Psychology, 75, 2, 1962, 232-241.

Wurtman, Richard J. "Biological Implications of Artificial Illumination." Paper presented at I.E.S. Conference, 1968, Phoenix, Arizona. Illuminating Engineering Society Preprint Series, preprint no. 1.

Wurtman, Richard J.; Robert M. Neer. "Good Light and Bad." The New England Journal of Medicine, 282, 7, 12 February 1970, 2 pps.

Zankova, M. A.; E. I. Krivitskaya. "Effect of Irradiation by Ultraviolet Erythema Lamps on the Working Ability of School Children." Gigiena i Sanitariya, 31, April 1966, 41-44. Translation by Duro-Test Corporation, North Bergen, New Jersey.

COUNCIL OF PLANNING LIBRARIANS

Exchange Bibliography #288

THE PSYCHOLOGY AND PHYSIOLOGY OF LIGHT AND COLOR AS AN ISSUE IN
THE PLANNING AND MANAGING OF ENVIRONMENTS: A SELECTED BIBLIOGRAPHY.

Additional copies available from:

Council of Planning Librarians
Post Office Box 229
Monticello, Illinois, 61856

for \$1.50.

- - - - -



UNIVERSITY OF ILLINOIS-URBANA

016 7114C73E

C001

EXCHANGE BIBLIOGRAPHY URBANA ILL

288-300 1972



3 0112 029109060